USDA Natural Resources Conservation Service

Ecological site R047XA471UT
Mountain Very Steep Stony Loam (oak)

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

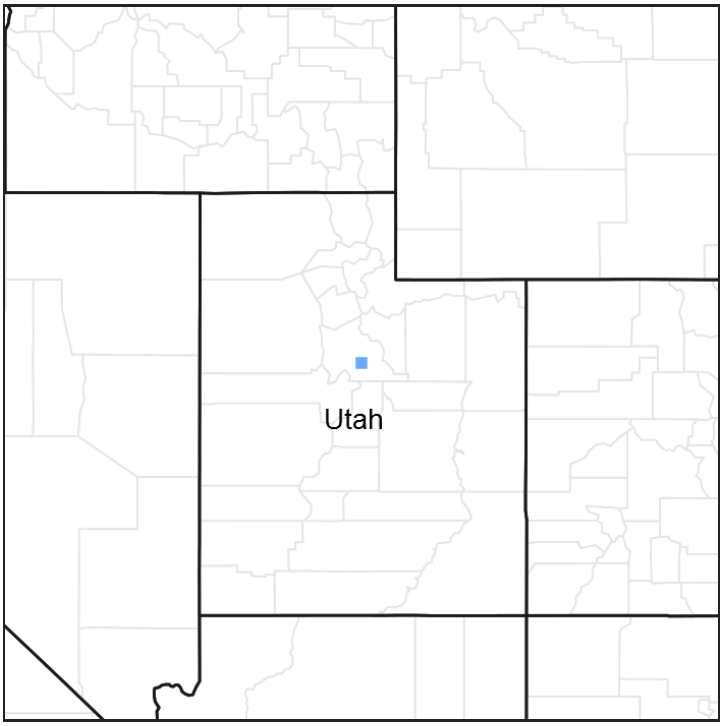

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Classification relationships

Modal Soil: Yeates Hollow STV-L, 40-70% — clayey-skeletal, montmorillonitic, frigid Typic Argixerolls

Associated sites

R047XA430UT	**Mountain Loam (mountain big sagebrush)**
R047XA432UT	**Mountain Loam (oak)**

Similar sites

R047XA432UT	**Mountain Loam (oak)**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Quercus gambelii* (2) *Artemisia tridentata ssp. vaseyana*
Herbaceous	Not specified

Physiographic features

This site occurs on alluvial fans, mountainsides and slump blocks at elevations between 5,500 and 8,250 feet. Slopes range from 35 to 80 percent and runoff is high.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Mountain slope (3) Slump block
Flooding frequency	None
Ponding frequency	None
Elevation	1,676–2,515 m
Slope	35–80%

Climatic features

The climate of this site is cool and humid with cold, snowy winters and cool dry summers. The average annual precipitation varies from 16 to 23 inches with an average of about 21. Distribution is about 65% during the plant dormant period (October through March). This winter moisture is the most dependable supply for plant growth. Lower precipitation and high evaporation-transpiration rates during july, august and september causes a slowing down in rate of plant growth and dormancy in most of the forbs and grasses.

Table 3. Representative climatic features

Frost-free period (average)	90 days

Freeze-free period (average)	0 days
Precipitation total (average)	635 mm

Influencing water features

Due to its landscape position, this site is not typically influenced by streams or wetlands.

Soil features

The soils of this site are well-drained and moderately deep to deep. They formed in colluvium and slope alluvium derived from sandstone, limestone, and shale. Soil texture is typically cobbly loam or channery loam with rock fragments making up greater than 45 percent of the soil volume. Rock fragments should be present on the soil surface. Available water-holding capacity ranges from 2.5 to 4.0 inches of water in the upper 40 inches of soil. The soil moisture regime is xeric and the soil temperature regime is frigid.

This site is correlated to soils in the following soil survey areas: (Soil components listed with soil map unit symbols in parentheses)

Sanpete Valley Area (UT627): Gappmayer (BH);

Table 4. Representative soil features

Surface texture	(1) Cobbly loam (2) Channery loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	51 cm
Surface fragment cover <=3"	15–50%
Surface fragment cover >3"	3–15%
Available water capacity (0-101.6cm)	6.35–10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0

Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	27–59%
Subsurface fragment volume >3" (Depth not specified)	0–29%

Ecological dynamics

Species that are not a part of the climax that are most likely to invade the site under excessive grazing use are cheatgrass, annual forbs, curlycup gumweed, houndstongue, flannel mullein, tarweed, rubber rabbitbrush and snakeweed. Gambel oak will increase and may become almost a pure stand under excessive grazing use or repeated range fires.

State and transition model

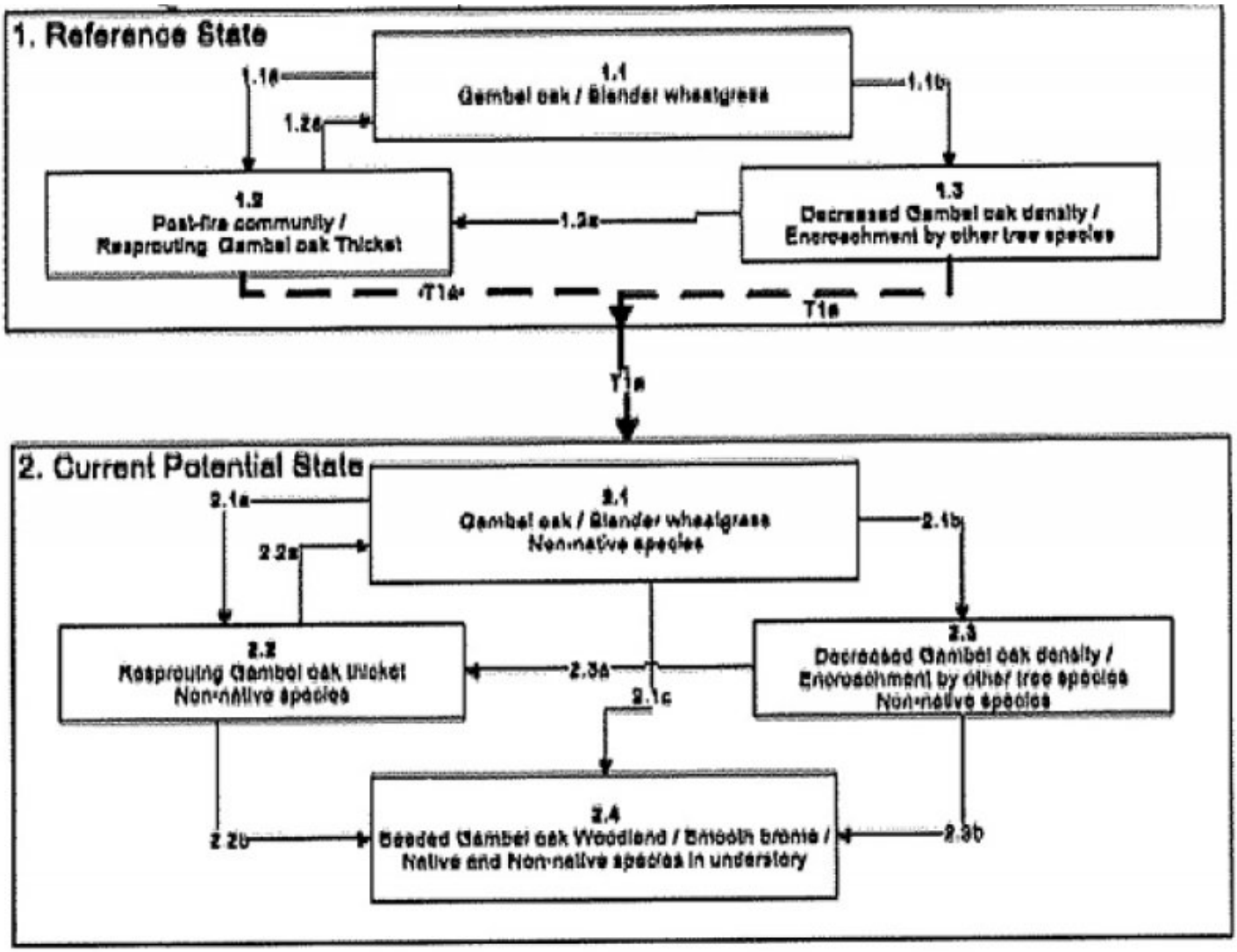

Figure 3. STM

State 1
Reference State

Community 1.1
Reference State

The vegetation of this site is 35 percent perennial grasses, 10 percent forbs, and 55 percent shrubs with a general oakbrush aspect.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	894	1141	1388
Grass/Grasslike	569	726	883
Forb	163	207	252
Total	**1626**	**2074**	**2523**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	39-41%
Grass/grasslike foliar cover	24-26%
Forb foliar cover	9-11%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	–	9-11%
>0.3 <= 0.6	–	–	24-26%	–
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	39-41%	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
0	**Dominant Shrubs**			745–1065	
	Gambel oak	QUGA	*Quercus gambelii*	532–639	–
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	106–213	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	106–213	–
3	**Sub-Dominant Shrubs**			234–596	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	106–213	–
	Saskatoon serviceberry	AMAL2	*Amelanchier alnifolia*	21–64	–
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	21–64	–
	yellow rabbitbrush	CHVIV4	*Chrysothamnus viscidiflorus ssp. viscidiflorus var. viscidiflorus*	21–64	–
	slender buckwheat	ERMI4	*Eriogonum microthecum*	21–64	–
	creeping barberry	MARE11	*Mahonia repens*	21–64	–
	mountain	SYOR2	*Symphoricarpos oreophilus*	21–64	–

	snowberry				
Grass/Grasslike					
0	**Dominant Grasses**			277–532	
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	106–213	–
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	106–213	–
	muttongrass	POFE	*Poa fendleriana*	64–106	–
1	**Sub-Dominant Grasses**			319–745	
	Grass, annual	2GA	*Grass, annual*	106–213	–
	Grass, perennial	2GP	*Grass, perennial*	106–213	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	21–64	–
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	21–64	–
	California brome	BRCA5	*Bromus carinatus*	21–64	–
	Geyer's sedge	CAGE2	*Carex geyeri*	21–64	–
	basin wildrye	LECI4	*Leymus cinereus*	21–64	–
Forb					
2	**Sub-Dominant Forbs**			405–1022	
	Forb, annual	2FA	*Forb, annual*	106–319	–
	Forb, perennial	2FP	*Forb, perennial*	106–319	–
	common yarrow	ACMI2	*Achillea millefolium*	21–43	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	21–43	–
	shortstem buckwheat	ERBR5	*Eriogonum brevicaule*	21–43	–
	sticky purple geranium	GEVI2	*Geranium viscosissimum*	21–43	–
	Nevada pea	LALA3	*Lathyrus lanszwertii*	21–43	–
	low beardtongue	PEHU	*Penstemon humilis*	21–43	–
	spiny phlox	PHHO	*Phlox hoodii*	21–43	–
	American vetch	VIAM	*Vicia americana*	21–43	–

Animal community

This site provides a fairly good balance of nutritious forage. Sheep, cattle, and horses do well grazing during the spring, summer, and fall seasons.
Wildlife potential is fair to poor for openland, good to fair for woodland, very poor for

wetland and good to fair for rangeland.
It is good habitat for chukars, quail, mule deer, elk, songbirds, squirrels, snowshoe hare, cottontails, bobcat, and coyotes. It is fair habitat for cougars, bear, golden eagle, hawks and small mammals.

Hydrological functions

The soil series in this site are in c hydrologic group. When the vegetation is in good condition, the hydrologic curve number is 74.

Recreational uses

This site has excellent potential for aesthetics and natural beauty. It has a large number of forbs and shrubs which have flowers in bloom from early spring throughout the summer and late into the fall. It has shrubs which offer screening for camping and picnicking. Hunting is good for upland game birds, snowshoe hare, elk, and mule deer. Fishing is opportune on streams through and adjacent to this site. This site has values for snowmobiling and skiing during a fairly long period of the season.

Wood products

Fence posts and stays can be harvested from the Gambel oak. This species also supplies fireplace wood, campfire wood and materials for knick-knacks and novelties.

Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Date	11/27/2012
Approved by	Shane A. Green

Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Some rills may be present, and their appearance may intensify where slopes approach 80% . Their expression may be less defined where coarse fragments (i.e., cobbles or gravels) dominate the soil surface. Rill occurrence may increase slightly on areas located below exposed bedrock or other water shedding areas where increased runoff may occur. Rills should be <1 inches deep, somewhat long (10 to 15 feet) and somewhat widely spaced (8-12 feet). An increase in rill development may be observed immediately following major thunderstorm or spring runoff events.

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2. **Presence of water flow patterns:** Sinuous flow patterns are common and wind around perennial plants and surface rock. Evidence of flow patterns is expected to increase somewhat as slopes approach 80%. Water flow patterns are long (20 to 30 feet), somewhat narrow (1 to 2 feet wide), and spaced widely (5 to 10 yards) and more closely spaced(3 to 6 yards) on slopes nearing 70 to 80%.

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3. **Number and height of erosional pedestals or terracettes:** Small pedestals will form at the base of plants that occur on the edge of water flow patterns, 2 to 4% of plants show minor exposed roots. Terracettes are fairly common, forming behind debris dams of small to medium sized litter (up to 2 inches in diameter) in water flow patterns. These debris dams may accumulate smaller litter (leaves, grass and forb stems) and sediment.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20–25%. (Soil surface is typically covered by 40-60% surface fragments). Most bare ground is associated with water flow patterns, rills, and gullies. Bare ground spaces not associated with flow patterns should not be greater than 1 to 2 feet in diameter.

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5. **Number of gullies and erosion associated with gullies:** A few gullies may occur. Any gullies present may extend down the length of the site until they reach a stream or other area where water and sediment is diverted or accumulates. Gullies show slightly more indication of

erosion as slopes approach 80%, or where the site occurs adjacent to watershed areas with concentrated flow patterns.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None. Perennial shrubs along with surface coarse fragments on this site help break the wind and reduce the potential for wind erosion.

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7. **Amount of litter movement (describe size and distance expected to travel):** Because of the sites very steep slopes, some litter redistribution downslope caused by water movement is normal. Some litter removal may occur in flow channels with deposition occurring within 3 to 5 feet at points of obstruction. The majority of litter still accumulates at the base of plants. Some grass leaves, stems and small woody twigs may accumulate in soil depressions adjacent to plants. Woody stems are likely to move 1 to 2 feet. A slight increase in litter movement is expected following runoff resulting from heavy spring runoff or thunderstorms.

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** This site should have an erosion rating of 5 or 6. Vegetation cover, litter, biological soil crusts and surface rock reduce erosion.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** (Gappmayer) Soil surface A horizon is typically 0 to 6 inches deep. Surface texture is a cobbly light loam which may have an organic mat of partially decomposed leaves and twigs 2 inches deep on the surface. Structure is weak very fine granular. Color is very dark grayish brown (10YR 3/2). A Mollic epipedon extends 19 inches into the soil profile. Use the specific information for the soil you are assessing found in the published soil survey to supplement this description.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Good spatial distribution of plants and well developed biological soil crusts (where present) intercept raindrops, reducing splash erosion and providing areas of increased surface detention to store water, allowing additional time for infiltration.

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Some soils may have natural textural variability within their profiles, including changes in clay and coarse fragment content, these should not be mistaken for a compaction pans.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant: Sprouting shrub (Gambel Oak) >> Non-sprouting shrubs (Mountain big sagebrush) > cool season perennial grasses (bluebunch wheatgrass, muttongrass) >> rhizomatous grasses (slender wheatgrass).

    Sub-dominant: forbs (thickleaf peavine, shortstem wild buckwheat)

    Other: Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state. Biological soil crust is variable in its expression where present on this site and is measured as a component of ground cover. Forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

    Additional: Factors contributing to temporal variability include insects and other pathogens (mistletoe), drought, extreme precipitation events, etc. Factors contributing to spatial variability include slope, amount of rock fragments, aspect, etc. Following a recent disturbance such as fire, drought or insects, that may remove the woody vegetation, forbs and perennial grasses (herbaceous species) may become more dominate in the community. These conditions may reflect different functional community phases within the reference state.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** There may be partial mortality on individual bunchgrasses and shrubs during drought periods, and complete mortality of individual plants during severe drought periods. Following fire, mature oak will die but vigorous re-sprouting of young oak seedlings is common. Hard spring frosts can kill gambel oak.

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14. **Average percent litter cover (%) and depth (in):** Cover should be composed mostly of fine litter. Depth should vary from a 1 thickness in the interspaces, to up to 1 1/2 under

herbaceous canopies, and up to 2” under shrub canopies. Litter cover may increase to 35% on some years due to increased production of plants.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production in air-dry herbage should be approximately 1800 - 1900#/acre on an average year, but could range from 1400 to 2300#/acre during periods of prolonged drought or above average precipitation.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Few invasive species are capable of dominating this site. When invasion does occur, cheatgrass, alyssum, and mustard species are the most likely species to invade.

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17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce in all years, except in extreme drought years. There are no restrictions on either seed or vegetative reproduction. Some seedling recruitment of major species is present during average and above average growing years.
